AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended): A magneto-resistance device comprising:

an anti-ferromagnetic layer;

a pinned ferromagnetic layer having a fixed spontaneous magnetization and coupled with said anti-ferromagnetic layer;

a non-magnetic tunnel insulating layer coupled with said pinned ferromagnetic layer; and

a free ferromagnetic layer coupled with said tunnel insulating layer and having a reversible free spontaneous magnetization,

wherein said pinned ferromagnetic layer comprises a first composite magnetic layer configured to prevent at least one of elements of said anti-ferromagnetic layer from diffusing into said tunnel insulating layer, and materials forming the first composite magnetic layer are intermixed according to a ~~composite~~ composition ratio, and wherein said first composite magnetic layer comprises ferromagnetic material that has been not oxidized; and an oxide of a material which is easy to combine with oxygen compared with said ferromagnetic material.

2. (Original) The magneto-resistance device according to claim 1, wherein said anti-ferromagnetic layer contains Mn, and

said first composite magnetic layer prevents said Mn from diffusing into said tunnel insulating film.

3. (canceled).

4. (Currently Amended) The magneto-resistance device according to claim 1~~3~~, wherein said ferromagnetic material contains Co in as a main component.

5. (Previously Presented) The magneto-resistance device according to claim 1, wherein said first composite magnetic layer is formed from a region of an amorphous phase as a whole or from a region of said amorphous phase and a region of a crystalline phase.

6. (Original) The magneto-resistance device according to claim 5, wherein said crystalline phase region contains a plurality of crystal regions, and

said plurality of crystal regions pass through said first composite magnetic layer into a direction of a thickness of said first composite magnetic layer.

7. (Previously Presented) The magneto-resistance device according to claim 5, wherein a composition of said amorphous phase in said first composite magnetic layer is $D_ZM_{1-Z}O_X$ ($0.6 \leq Z \leq 0.9$, and $X > 0$),

said D is at least one selected from the group consisting of Co, Fe and Ni, and

said M is at least one selected from the group consisting of Ta, Zr, Hf, Nb, and Ce.

8. (Currently Amended) ~~The magneto-resistance device according to claim 1~~A magneto-resistance device comprising:

an anti-ferromagnetic layer;

a pinned ferromagnetic layer having a fixed spontaneous magnetization and coupled with said anti-ferromagnetic layer;

a non-magnetic tunnel insulating layer coupled with said pinned ferromagnetic layer; and

a free ferromagnetic layer coupled with said tunnel insulating layer and having a reversible free spontaneous magnetization,

wherein said pinned ferromagnetic layer comprises a first composite magnetic layer configured to prevent at least one of elements of said anti-ferromagnetic layer from diffusing into said tunnel insulating layer, and materials forming the first composite magnetic layer are intermixed according to a composition ratio, and~~,~~

wherein said first composite magnetic layer contains a plurality of crystal grains comprising ferromagnetic material,

said plurality of crystal grains are separated from each other by oxide, and

a part of said plurality of crystal grains contacts an adjacent one of said plurality of crystal grains.

9. (Original) The magneto-resistance device according to claim 8, wherein said oxide comprises oxide of at least an element selected from the group consisting of Al, Si, Mg and Ti.

10. (Currently Amended) ~~The magneto-resistance device according to claim 1,~~ A magneto-resistance device comprising:

an anti-ferromagnetic layer;

a pinned ferromagnetic layer having a fixed spontaneous magnetization and coupled with said anti-ferromagnetic layer;

a non-magnetic tunnel insulating layer coupled with said pinned ferromagnetic layer; and

a free ferromagnetic layer coupled with said tunnel insulating layer and having a reversible free spontaneous magnetization,

wherein said pinned ferromagnetic layer comprises a first composite magnetic layer configured to prevent at least one of elements of said anti-ferromagnetic layer from diffusing into said tunnel insulating layer, and materials forming the first composite magnetic layer are intermixed according to a composition ratio, and

wherein said first composite magnetic layer contains a plurality of crystal grains comprising ferromagnetic material, and said plurality of crystal grains are separated from each other by oxide and pass through said first composite magnetic layer into a direction of a thickness of said first composite magnetic layer.

11. (Original) The magneto-resistance device according to claim 10, wherein a part of said plurality of crystal grains contacts an adjacent one of said plurality of crystal grains.

12. (Previously Presented) The magneto-resistance device according to claim 10, wherein said oxide comprises oxide of at least an element selected from the group consisting of Al, Si, Mg, Ti, Ta, Hf, Zr, Nb and Ce.

13. (Previously Presented) The magneto-resistance device according to claim 8, wherein a thickness of said oxide is thinner than a grain diameter of each of said plurality of crystal grains.

14. (Original) The magneto-resistance device according to claim 13, wherein the thickness of said oxide is equal to or less than 2 nm.

15. (Original) The magneto-resistance device according to claim 14, wherein an average grain diameter of said plurality of crystal grains is equal to or less than 10 nm.

16. (Previously Presented) The magneto-resistance device according to claim 8, wherein ferromagnetic coupling is kept between said plurality of crystal grains.

17. (Previously Presented) The magneto-resistance device according to claim 1, wherein said pinned ferromagnetic layer further comprises a first metal ferromagnetic layer and a second metal ferromagnetic layer, and

said first composite magnetic layer is interposed between said first metal ferromagnetic layer and said second metal ferromagnetic layer.

18. (Previously Presented) The magneto-resistance device according to claim 1, wherein a resistivity of said first composite magnetic layer is in a range of 10 μΩcm to 3000 μΩcm.

19. (Currently Amended) ~~The magneto-resistance device according to claim 1,~~ A magneto-resistance device comprising:

an anti-ferromagnetic layer;

a pinned ferromagnetic layer having a fixed spontaneous magnetization and coupled with said anti-ferromagnetic layer;

a non-magnetic tunnel insulating layer coupled with said pinned ferromagnetic layer; and

a free ferromagnetic layer coupled with said tunnel insulating layer and having a reversible free spontaneous magnetization,

wherein said pinned ferromagnetic layer comprises a first composite magnetic layer configured to prevent at least one of elements of said anti-ferromagnetic layer from diffusing into said tunnel insulating layer, and materials forming the first composite magnetic layer are intermixed according to a composition ratio, and

wherein said free ferromagnetic layer comprises: a second composite magnetic layer configured to prevent at least one elements of said free ferromagnetic layer from diffusing into said tunnel insulating layer.

20. (Original) The magneto-resistance device according to claim 19, wherein said free ferromagnetic layer contains Ni, and

said second composite magnetic layer prevents said Ni from diffusing into said tunnel insulating film.

21. (Previously Presented) The magneto-resistance device according to claim 20, wherein said free ferromagnetic layer comprises:

a metal ferromagnetic layer provided between said tunnel insulating layer and said second composite magnetic layer; and

a soft magnetic layer containing said Ni and connected to said second composite magnetic layer on an opposite side to said metal ferromagnetic layer.

22. (Previously Presented) The magneto-resistance device according to claim 1, wherein said pinned ferromagnetic layer comprises:

a non-magnetic layer; and

two ferromagnetic layers anti-ferromagnetically coupled to each other through said non-magnetic layer.

23. (Previously Presented) The magneto-resistance device according to claim 19, wherein said free ferromagnetic layer comprises:

a non-magnetic layer; and

two ferromagnetic layers anti-ferromagnetically coupled through said non-magnetic layer.

24 - 27. (Cancelled)

28. (Currently Amended) ~~The magnetic memory according to claim 24,~~ A magnetic memory comprising a magneto-resistance device which comprises:

an anti-ferromagnetic layer;

a pinned ferromagnetic layer having a fixed spontaneous magnetization and coupled with said anti-ferromagnetic layer;

a non-magnetic tunnel insulating layer coupled with said pinned ferromagnetic layer; and

a free ferromagnetic layer coupled with said tunnel insulating layer and having a reversible free spontaneous magnetization,

wherein said pinned ferromagnetic layer comprises a first composite magnetic layer configured to prevent at least one of elements of said anti-ferromagnetic layer from diffusing into said tunnel insulating layer, and wherein materials forming the first composite magnetic layer are intermixed according to a composition ratio, and

wherein said free ferromagnetic layer comprises: a second composite magnetic layer configured to prevent at least one elements of said free ferromagnetic layer from diffusing into said tunnel insulating layer.

29. (Canceled).

30. (Currently Amended) The magneto-resistance device according to claim 1, wherein said materials intermixed according to said composition ~~composite~~ ratio make up a single composite magnetic layer.

31-32. (Canceled).